

Patent Claims

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1. Magnetically journalled rotational arrangement comprising a substantially disc shaped or ring shaped magnetically journalled rotor (1) and a stator (2) which comprises means for the production of a field which produces a rotation of the rotor (1), characterised in that the rotor has means (M, 11, 12) which produce a unipolar bias magnetisation flux which is spatially modulated when viewed in the circumferential direction.
2. Rotational arrangement in accordance with claim 1 characterised in that the means for producing the spatially modulated bias magnetisation flux comprise permanent magnets (M) which are distributedly arranged on the substantially disc shaped or ring shaped rotor (1).
3. Rotational arrangement in accordance with claim 2 characterised in that the permanent magnets (M) are arranged at both sides of the disc shaped or ring shaped rotor.
- a 4. Rotational arrangement in accordance with claim 2 ~~or claim 3~~ characterised in that the permanent magnets (M) have an axial or a radial magnetisation.
5. Rotational arrangement in accordance with ~~one of the claims 2 to 4~~ characterised in that permanent magnets (M) are provided both on the rotor (1) and on the stator (2); and in that both the permanent magnets (M) provided on the rotor (1) and the permanent magnets (M) arranged on the stator (2) are magnetised in the axial direction.

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6. Rotational arrangement in accordance with ~~one of the~~ claims 2 ~~to 4~~ characterised in that permanent magnets (M) are provided both on the rotor (1) and on the stator (2); and in that both the permanent magnets (M) provided on the rotor (1) and the permanent magnets (M) arranged on the stator (2) are magnetised in the radial direction.
7. Rotational arrangement in accordance with ~~one of the~~ claims 2 ~~to 4~~ characterised in that permanent magnets (M) are provided both on the rotor (1) and on the stator (2); and in that the permanent magnets (M) provided on the rotor (1) are magnetised in the axial direction while the permanent magnets (M) arranged on the stator (2) are magnetised in the radial direction or vice versa.
8. Rotational arrangement in accordance with ~~one of the~~ preceding claims characterised in that, in addition to the means for the production of the field which produces the rotation of the rotor (1), the stator (2) comprises permanent magnets (M) which are arranged in such a manner that they cooperate with the means provided on the rotor (1) for the production of the spatially modulated bias magnetisation flux in such a manner that they produce or reinforce the magnetic journalling of the rotor (1).
9. Rotational arrangement in accordance with claim 8 characterised in that the means provided at the rotor (1) for the production of the spatially modulated unipolar bias magnetisation flux comprise a plurality of projections (12) which point in the radial

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direction and recesses (11) which are arranged between these projections.

10. Rotational arrangement in accordance with ~~one of the preceding claims~~ characterised in that control windings (20) are provided in the stator (2) in order to control the spatially modulated unipolar bias magnetisation flux.
11. Rotational arrangement in accordance with claim 8 characterised in that the stator (2, 21) effecting the magnetic journalling of the rotor is designed substantially in ring shape and surrounds the ring or disc shaped rotor, with the stator plane and the rotor plane coinciding and forming the bearing plane; and in that means for the production of the field which produce the rotation of the rotor (1) are arranged in the segments between the permanent magnets (M) in the stator (2, 21) so that the motor plane in which the rotation of the rotor (1) is produced and the bearing plane in which the journalling of the rotor is produced coincide.
12. Rotational arrangement in accordance with claim 11 characterised in that the means for the production of the field which effects the rotation of the rotor and which is arranged in the segments between the permanent magnets (M) has U-shaped coil cores (24) with windings (241), with the U-shaped coil cores (24) being arranged in the bearing plane.
13. Rotational arrangement in accordance with claim 11 characterised in that the means for the production of the field which effects the rotation of the rotor and which is arranged in the segments between the
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permanent magnets (M) has U-shaped coil cores (24) with windings (241), with the U-shaped coil cores (24) being arranged perpendicular to the bearing plane.

14. Rotational arrangement in accordance with claim 8 characterised in that the stator (2, 21) producing the magnetic journalling of the rotor is designed to be substantially ring shaped and surrounds the ring or disc shaped rotor (1), with the stator plane and the rotor plane coinciding and forming the bearing plane; and in that moreover the stator comprises at least one further ring or disc shaped motor stator (22, 23) which is arranged in a motor plane parallel to the bearing plane.
15. Rotational arrangement in accordance with claim 14 characterised in that the permanent magnets (M) are arranged on both sides of the rotor (1); and in that the stator, in addition to the ring-shaped stator (21) which produces the magnetic journalling of the rotor, comprises two further ring-shaped motor stators (22, 23), of which one motor stator (22) is arranged in a first motor plane parallel to the bearing plane on the one side of the bearing stator and the other (23) in a second motor plane parallel to the bearing plane.
16. Rotational arrangement in accordance with claim 14 characterised in that the stator, in addition to the ring-shaped stator (21) which produces the magnetic journalling of the rotor, comprises a further disc shaped stator in a motor plane parallel to the bearing plane, with this motor stator (25) being designed as a disc rotor stator and having a preferably iron-less disc rotor winding (250) for the production of the field for the rotation of the rotor (1).

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17. Rotational arrangement in accordance with claim 8 characterised in that the means for the production of the field which effects the rotation of the rotor (1) comprises a rotatable drive (26) which can be magnetically coupled to the rotor (1) and the axis of rotation of which coincides with the axis of rotation of the rotor (1).
18. Rotational arrangement in accordance with claim 17 characterised in that the drive (26) comprises permanent magnets (M) which are magnetised in the axial direction.
19. Rotational arrangement in accordance with claim 17 characterised in that the drive (26) comprises permanent magnets (M) which are magnetised in the radial direction.
20. Forwarding apparatus, in particular for highly pure or biological liquids, especially a blood pump, with a rotational arrangement in accordance with ~~one of the~~ claims 1 ~~to 19~~.
21. Stirrer for a bio-reactor comprising a rotational arrangement in accordance with ~~one of the~~ claims 1 ~~to 19~~.

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